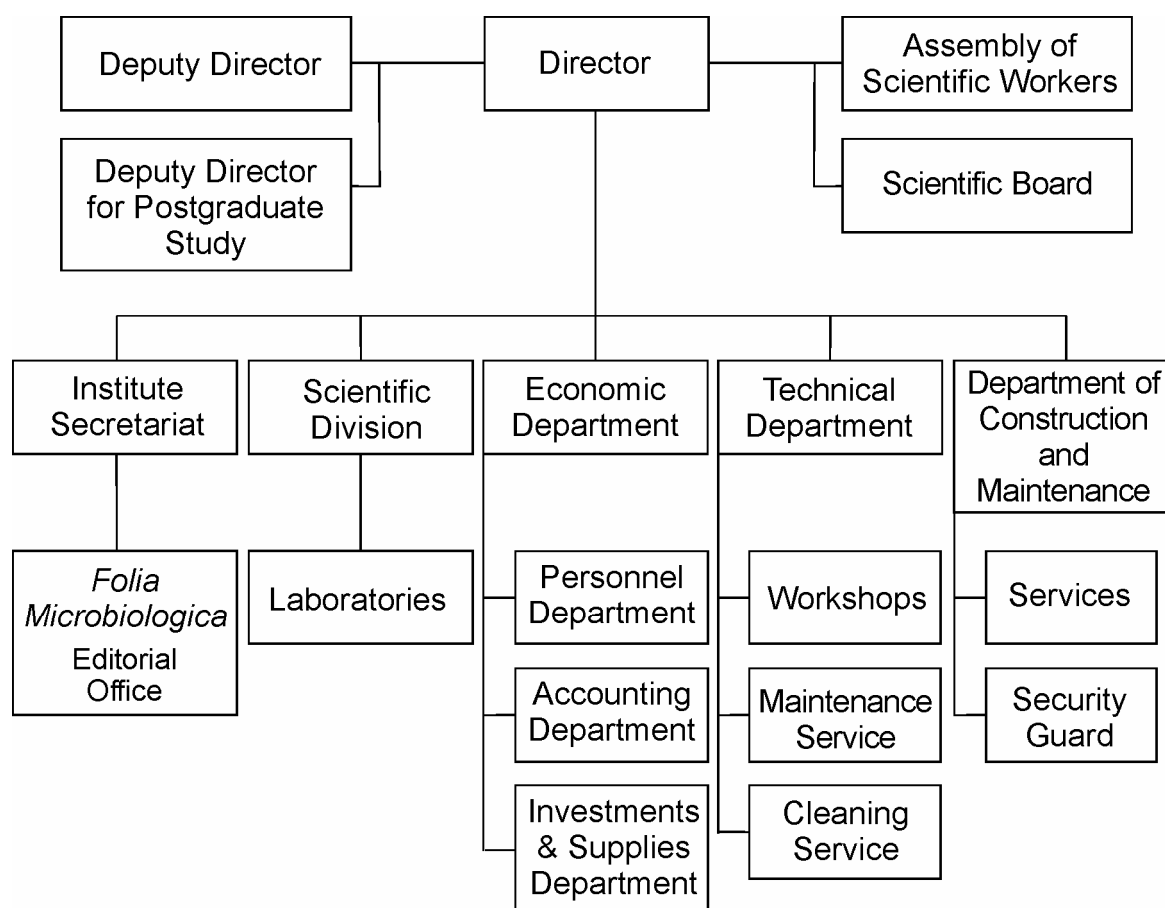

DIRECTOR'S INTRODUCTION

This Biannual Report 2005–2006 surveys important events and activities of the *Institute of Microbiology Academy of Science of the Czech Republic*. The Institute was founded on 1st January 1962 as an Institute of the *Czechoslovak Academy of Sciences*. In 1992, the Institute became part of the newly established *Academy of Sciences of the Czech Republic*.

The Institute activity is focused on microbial physiology, biochemistry and genetics, molecular biology and molecular microbiology, microbial products and their synthesis and production, biodegradation activities of microorganisms and symbiotic relations in biological models, and new biotechnological processes. Another research area includes physiology and regulation of natural and acquired immunity mechanisms, investigation of ontogenetic development of these mechanisms in conventional and germ-free models and study of causality and possible therapy of tumor and autoimmune diseases. The number of university-trained researchers and/or scientific workers was 278/120 in 2005 and 288/148 in 2006.

The Institute is divided into five Divisions, including two out-house sections. Two laboratories of the *Division of Immunology and Gnotobiology (Laboratory of Physiology, Immunity and Ontogenesis of Gnotobionts and the Laboratory of Immune Regulations)* are located in Nový Hrádek in East Bohemia and *Division of Autotrophic Microorganisms* is located in Třeboň in South Bohemia. The Divisions are stable organizations in contrast to Laboratories created on the basis of particular scientific interests and reflecting modern trends in the field of microbiology and immunology. In 2006 *Laboratory of Electron Microscopy* fused with the *Laboratory of Molecular Structure Characterization (Division of Biogenesis and Biotechnology of Natural Compounds)* and two new laboratories were created; *Laboratory of Regulation of Gene Expression* within the *Division of Cell and Molecular Microbiology* and *Laboratory of Functional Cytology* within the *Division of Ecology*. In the *Division of Autotrophic Microorganisms*, *Laboratory of Cell Cycles and Biotechnology of Algae* split again into *Laboratory of Biotechnology of Algae* and *Laboratory of Algal Cell Cycles*. Collaboration among researchers in different Divisions and Laboratories is a priority, providing important flexibility and the transfer of knowledge among scientifically different fields.

In 2005 researchers of the Institute were involved in three Research Centers (*Research Center of Targeted Therapeutics*, *Center of Molecular and Cellular Immunology* and *Research Center for Study of Extract Compounds of Barley and Hop*) and in two Centers of Basic Research (*Center on Molecular Biology and Physiology of Yeast Communities* and *Center of Functional Organization of the Cell*). In 2006 Institute had already five Research Centers (*Research Center of Targeted Therapeutics*, *Center of Molecular and Cellular Immunology*, *Research Center for Study of Extract Compounds of Barley and Hop*, *Center of Molecular Methods for Monitoring the Diffuse Pollution of the Environment* and *Center for Nanoparticle and Supramolecular Systems for Targeted Transport of Drugs*) and four Basic Research Centers (*Center on Molecular Biology and Physiology of Yeast Communities*, *Center of Functional Organization of the Cell*, *Center of Biocatalysis and Biotransformation* and *Center for Environmental Microbiology*).



In 2005 and 2006 the Institute's research was supported by both domestic and international grants. The number of grant-supported projects in 2005 was 145, out of which 32 were funded from international grant agencies. Out of 157 grant-supported projects in 2006, 30 had an international status. In 2005/2006 the Institute had 20/17 economic contracts on scientific cooperation with different private or semiprivate Czech companies.

The Institute has a long-lasting and fruitful collaboration with Czech Universities such as *Charles University*, *University of Chemical Technology* and *Czech Agricultural University*

in Prague, *University of South Bohemia* in České Budějovice, *Palacký University* in Olomouc, *Masaryk University* in Brno and *Technical University* in Liberec. The collaboration between the Institute and some Universities is based on official Association Agreements. The Institute has such an agreement with the *Faculty of Science, Charles University; Faculty of Mathematics and Physics, Charles University; 1st School of Medicine, Charles University; Faculty of Biological Sciences, University of South Bohemia; Faculty of Food and Biochemical Technology and Faculty of Chemical Engineering, University of Chemical Technology and Technical University*.

The accredited doctoral programs are in *Microbiology (Faculty of Science, Charles University, Prague), Immunology (Faculty of Science, Charles University, Prague; 1st, 2nd and 3rd Faculty of Medicine, Charles University, Prague), Molecular and Cellular Biology, Genetics and Virology (Faculty of Science, Charles University, Prague; 1st, 2nd and 3rd Faculty of Medicine, Charles University, Prague) Biochemistry (Institute of Chemical Technology, Prague), Organic chemistry (Institute of Chemical Technology, Prague), Biotechnology (Institute of Chemical Technology, Prague), Physics and Biophysics, Chemical and Macromolecular Physics (Faculty of Mathematics and Physics, Charles University, Prague; University of South Bohemia)*.

For its biomedical research the Institute has accreditation for work with animals and owns modern animal houses in Prague and Nový Hrádek. Conventional animals and genetically modified organisms (GMO) mice are housed in Prague. A newly reconstructed animal house in Nový Hrádek is equipped also for rising of and experiments with germ-free animals (mice, rats and piglets) and severe combined immunodeficiency disease (SCID) mice.

In cooperation with universities, the Institute organizes pre- and postgraduate studies in the fields of microbiology, immunology, molecular and cell biology, genetics and virology, biochemistry, organic chemistry, biotechnology, biophysics, chemical and macromolecular physics and other areas covered by accreditation. The Institute's scientists help undergraduate and PhD. students to fulfill their potential and act as supervisors for both diploma theses and dissertation theses. Our cohort of undergraduate students (48 in 2005, 54 in 2006) and PhD. students (116 in 2005, 114 in 2006) from different universities plays a significant role in the Institute's research program.

Numerous courses were taught and lectures were given by the Institute staff in several universities (Praha, České Budějovice, Nové Hradky, Olomouc, Plzeň) in 2005–2006.

Participation in university teaching

School year	2005		2006	
	S	W	S	W
Number of hours	361	281	326	266
Number of courses and lectures	19	18	19	18
Number of lecturing employees	14	16	14	16

According to Institute's tradition, the director confers yearly awards on the authors of the best paper, best PhD. and best diploma thesis.

2005 awards

Best paper

VÁCHOVÁ L., PALKOVÁ Z.: Physiological regulation of yeast cell death in multicellular colonies is triggered by ammonia

Journal of Cell Biology **169**, 711–717 (2005)

Division of Cell and Molecular Microbiology

Best PhD. thesis

MALÝ J.: Electrochemical biosensors for herbicide detection based on the Photosystem II complex

Division of Autotrophic Microorganisms

Faculty of Biological Sciences, University of South Bohemia

Supervisor – Jiří Masojídek, DSc. (*Institute of Microbiology*)

Best diploma theses

VALÁŠKOVÁ V.: Degradation of lignocellulose by the brown-rot fungus *Piptoporus betulinus*

Faculty of Science, Charles University, Prague

Supervisor – Petr Baldrian (*Institute of Microbiology*)

VANĚK O.: Preparation and structural studies of CD69 protein, the NK-cell receptor

Faculty of Science, Charles University, Prague

Supervisor – Karel Bezouška (*Institute of Microbiology and Faculty of Science, Charles University, Prague*)

2006 awards

Best papers

GROSSMANN G., OPEKAROVÁ M., MALÍNSKÝ J., WEIG-MECKL I., TANNER W.: Membrane potential governs lateral segregation of plasma membrane proteins and lipids in yeast

The EMBO Journal **26**, 1–8 (2007)

Division of Cell and Molecular Microbiology

BINAROVÁ P., CENKLOVÁ V., PROCHÁZKOVÁ J., DOSKOČILOVÁ A., VOLC J., VRLÍK M., BÖRGE L.: γ -Tubulin is essential for acentrosomal microtubule nucleation and coordination of late mitotic events in *Arabidopsis*

Plant Cell **18**, 1199–1212 (2006)

Division of Ecology

Best PhD. theses

FIALOVÁ P.: Modified substrates β -*N*-acetylhexosaminidase-catalyzed synthesis

*Division of Biogenesis and Biotechnology of Natural Compounds and
Division of Immunology and Gnotobiology*

Faculty of Science, Charles University, Prague

Supervisors – Vladimír Křen and Karel Bezouška (*Institute of Microbiology
and Faculty of Science, Charles University, Prague*)

MRKVAN T.: Cytostatic and immunomodulatory properties of polymeric prodrugs

Division of Immunology and Gnotobiology

Faculty of Science, Charles University, Prague

Supervisor – Blanka Říhová (*Institute of Microbiology*)

Best diploma theses

VEJVODA V.: Characteristics and application of nitrilases of filamentous fungi

Aspergillus niger K 10 and Fusarium solani O1

*Division of Biogenesis and Biotechnology of Natural Compounds and
Division of Immunology and Gnotobiology*

Faculty of Science, Charles University, Prague

Supervisors – Ludmila Martínková and Karel Bezouška (*Institute of Microbiology
and Faculty of Science, Charles University, Prague*)

SADÍLKOVÁ L.: Study and application of RTX proteins of Gram-negative bacteria

Division of Cell and Molecular Microbiology

Faculty of Science, Charles University, Prague

Supervisors – Radim Osička and Jan Konvalinka (*Institute of Microbiology
and Institute of Organic Chemistry and Biochemistry*)

The Institute has been organizing scientific congresses, conferences, symposia, seminars, and other national and international meetings in the Czech Republic and abroad. In 2005, these included the *Cukrblik workshop on Current Chemistry and Biochemistry of Saccharides* (March 31, Prague), *33rd Annual Conference on Yeasts* (May 11–13, Smolenice, Slovakia), *2nd Czech proteomic conference* (October 17–20, Lednice).

In 2006, institute's researchers were either responsible or involved in the organization of *10th International Symposium on the Genetics of Industrial Microorganisms* (June 24–28, Prague), *Workshop on Growth Points in Industrial Microbial Genetics* (June 26, Prague), *17th International Mass Spectrometry Conference* (August 27–September 1, Prague), *40th Annual Meeting of the European Society for Clinical Investigation* (March 15–18, Prague), *Czech–Scottish Conference on Nanomedicine* (September 24–26 Prague), *24th Small Meeting on Yeast Transport and Energetics* (SMYTE) (August 31–September 3, Prague), *XVIth Cytoskeletal Club* (May 17–19, Vranovská Ves); *34th Annual Conference on Yeasts* (May 10–12, Smolenice, Slovakia), *5th International Meeting on Yeast Apoptosis* (September 3–7, Kutná Hora); *4th Meeting of the Working Group WG D25/0002/02: Nitrile- and Amide-Converting Enzymes: Tools in Organic Chemistry* (April 18, Graz, Austria); *3rd Meeting of the Work-*

ing Group D28/008/03: Stereoselective Synthesis of Piperidine Derivatives as Useful Synthons for Target-Oriented and Diversity-Oriented Synthesis of Bioactive Natural Products and Analogues (March 3, Prague), *Workshop on Recent Developments in Invertebrate Immunology* (October 30–31, Brussels), *5th Meeting of the European Mucosal Immunology Group* (October 5–7, Prague).

Popularization of science is one of very important activities of the Institute. Institute's employees participate every year in organizing the Open Door Day and the Week of Science, publish popular scientific articles in youth journals, and are involved in organizing popularization exhibitions and other activities. They also publish popularizing articles in the newspapers, take part in radio or TV discussions on science or public affairs, attend briefings, *etc.*

As the editor and publisher of the international scientific journal *Folia Microbiologica*, the only impacted microbiological journal in the Czech Republic, the *Institute of Microbiology* has been involved in gathering, editing and disseminating scientific knowledge. The Institute also hosts two scientific societies, the *Czechoslovak Society for Microbiology*

<http://www.cssm.info>

and the *Czech Immunological Society*

<http://www.biomed.cas.cz/cis>.

Additional information on the Institute's performance in 2005–2006 can be found at the Internet address

<http://www.biomed.cas.cz/mbu>

Prof. RNDr. Blanka Říhová, PhD., DSc.

STRUCTURE AND ORGANIZATION – 2005

<i>Director:</i>	Prof. BLANKA ŘÍHOVÁ, PhD., DSc.
<i>Deputy Director:</i>	Assoc.Prof. JAROSLAV SPÍŽEK, PhD., DSc. MARTIN BILEJ, PhD., DSc. (since February)
<i>Deputy Director for Postgraduate Studies:</i>	JIŘÍ GABRIEL, PhD., DSc.
<i>Chairperson of Scientific Council:</i>	JIŘÍ HAŠEK, PhD.
<i>Head of Secretariat:</i>	ONDŘEJ SCHRÖFFEL, MA.
<i>Editor-in-Chief of Folia Microbiologica:</i>	JIŘÍ MATĚJŮ, PhD.

SCIENTIFIC DIVISIONS

Biogenesis and Biotechnology of Natural Compounds

Head: MIROSLAV FLIEGER, PhD.

Cell and Molecular Microbiology

Head: JAN NEŠVERA, PhD.

Ecology

Head: FRANTIŠEK NERUD, PhD.

Immunology and Gnotobiology

Head: MARTIN BILEJ, PhD., DSc.

Autotrophic Microorganisms

Head: VILÉM ZACHLEDER, PhD.

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Assoc.Prof. ONDŘEJ PRAŠIL, PhD.
(since April)